

CLAIMS

1. An n-type ohmic electrode for use with an n-type Group III nitride semiconductor, which is provided to contact with the surface of an n-type Group III nitride semiconductor layer, wherein the n-type ohmic electrode layer is made of an alloy of aluminum (atomic symbol: Al) and lanthanum (atomic symbol: La) or comprises lanthanum.
2. The n-type ohmic electrode according to claim 1, wherein the lanthanum content in the n-type ohmic electrode layer is 10 mass% or more on the surface contacting with the n-type Group III nitride semiconductor layer.
3. The n-type ohmic electrode according to claim 2, wherein the lanthanum content in the n-type ohmic electrode layer is less than 10 mass% in the region 30 nm or more distant from the junction interface with the n-type Group III nitride semiconductor layer.
4. The n-type ohmic electrode according to claim 3, wherein the surface of the n-type ohmic electrode layer opposite the surface contacting with the n-type Group III nitride semiconductor layer is made of aluminum.
5. A semiconductor light-emitting device fabricated by providing an ohmic contact electrode on a stacked structure body in which an n-type Group III nitride semiconductor layer and a p-type compound semiconductor layer are provided on one surface of a crystalline substrate and a light-emitting layer is interposed between the n-type and p-type compound semiconductor layers, wherein the n-type ohmic electrode provided to contact with the n-type Group III nitride semiconductor layer is made of a lanthanum-aluminum alloy layer or a lanthanum layer.
6. The semiconductor light-emitting device according to claim 5, wherein the n-type ohmic electrode comprises a lanthanum-aluminum alloy layer or a lanthanum

layer in the side contacting with the n-type Group III nitride semiconductor layer and comprises an aluminum layer in the opposite side.

7. The semiconductor light-emitting device
5 according to claim 5 or 6, wherein the n-type ohmic electrode comprises a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at the junction interface with the n-type Group III nitride semiconductor layer and having a lanthanum content of
10 less than 10 mass% in the region 30 nm or more distant from the junction interface.

8. A method for forming an n-type ohmic electrode, comprising forming a lanthanum-aluminum alloy layer constituting the n-type ohmic electrode, by using a
15 lanthanum-dialuminum alloy (compositional formula: LaAl_2) as a raw material.

9. The method for forming an n-type ohmic electrode according to claim 8, wherein the lanthanum-aluminum alloy layer is provided to join it to the
20 surface of an n-type Group III nitride semiconductor layer while setting the n-type Group III nitride semiconductor layer at 300°C or less, thereby forming an n-type ohmic electrode from a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at
25 the junction interface and having a lanthanum content of less than 10 mass% in the region 30 nm or more distant from the junction interface.

10. A method for producing a semiconductor light-emitting device, comprising providing an ohmic contact
30 electrode on a stacked structure body in which an n-type Group III nitride semiconductor layer and a p-type compound semiconductor layer are provided on one surface of a crystalline substrate and a light-emitting layer is interposed between the n-type and p-type compound
35 semiconductor layers, wherein the lanthanum-aluminum alloy layer constituting an n-type ohmic electrode which contacts with the n-type Group III nitride semiconductor

layer is formed by using a lanthanum-dialuminum alloy (compositional formula: LaAl_2) as a raw material.

11. The method for producing a semiconductor light-emitting device according to claim 10, wherein the
5 lanthanum-aluminum alloy layer is provided to join it to the surface of the n-type Group III nitride semiconductor layer while setting the n-type Group III nitride semiconductor layer at 300°C or less, thereby forming an
10 n-type ohmic electrode from a lanthanum-aluminum alloy layer having a lanthanum content of 10 mass% or more at the junction interface and having a lanthanum content of less than 10 mass% in the region 30 nm or more distant from the junction interface.